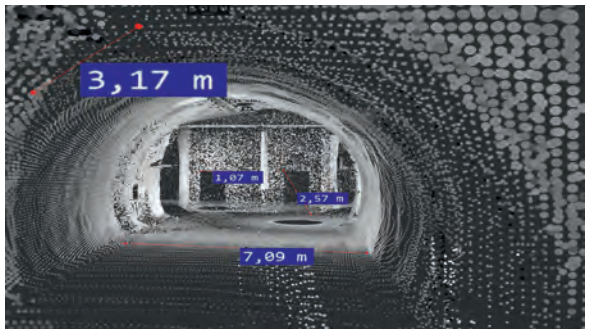
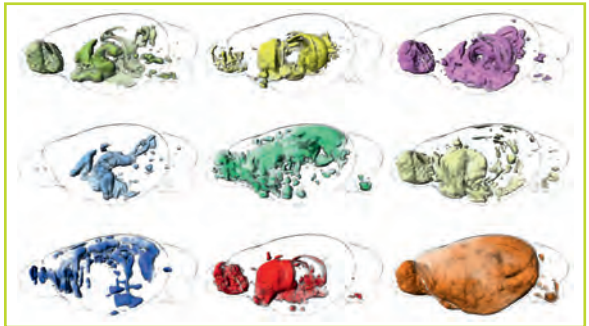


Recognise | Understand | Decide



v r vis

zentrum für
virtual reality und visualisierung
forschungs-gmbh

What is visualisation?

Images are the clearest language in the world. You see something and you understand it. That is why we depict data, connections and problems in the best possible visual as well as interactive form.

The future of economic growth and technological innovation is more than ever based on our ability to extract information from data. Visualisation offers:

Who are we?

As Austria's leading institute for research in visual computing, we have been building a bridge between science and industry for almost two decades.

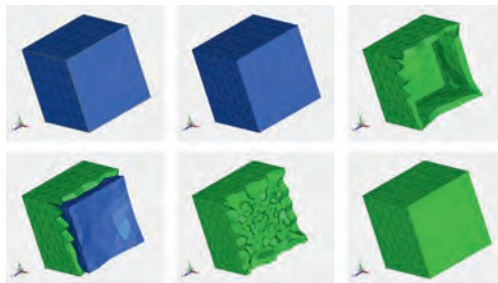
Our team of over 70 researchers work hard to boost the innovative potential of leading companies, primarily based in Austria, and to advance existing technologies. We also raise our profile through:

What do we offer?

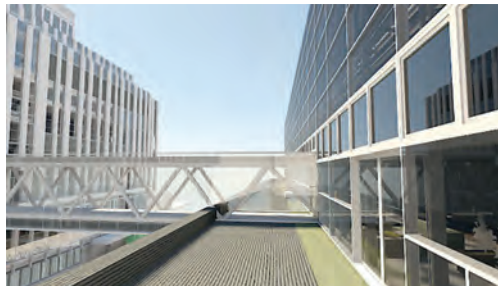
We offer solutions for all applications, from research prototypes to direct implementation into the company's own software framework.

We have solutions available for companies of all sizes, but also for the government and the general public. Companies without their own R&D department can also benefit from our expertise. We offer:

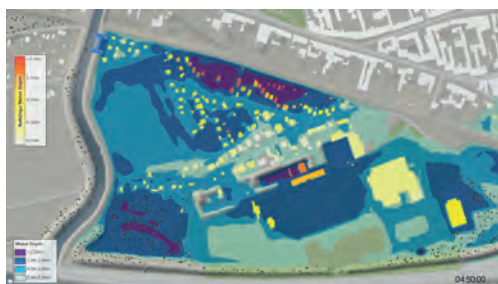
- Planning advice
- Decision-making support
- Process optimisation
- Project presentations
- Simulations



- Recognised publications at conferences
- Lectures & talks
- Promotion of young researchers
- Teaching activity



- Consulting
- Application-driven research and development
- Research and feasibility studies
- Project management



Decisions – a matter of viewpoints

Visualisation creates a basis for decision-making. The ability to see and understand something is one of the most important human capabilities. Illustrating and visualising connections is a crucial cultural technique, which continues to gain importance in our complex world. The future of economic growth and technological innovation is increasingly based on our ability to extract information from data and use it as a basis for decision-making. Numerous sensors, imaging techniques and mechanically produced data contribute to the fact that we, as a society, but also as part of technological progress (e.g. the Internet of Things, Industry 4.0), have to contend with the question of how to process that data and how to benefit from it. Data analysis and evaluation are the most important requirements. Visual computing is the solution to this very challenge.

Visual computing is an interdisciplinary technology

Visualisation is not limited to fixed areas of industry, but rather offers answers and solutions for the varied challenges of different markets. After all, images are a universal means of communication; they are easy to understand and accessible. We let the images speak differently based on the needs of our customers – in interactive or flexibly combinable visualisations.



Database, webinterface and interactive data mining techniques for neurocircuit research in *Drosophila* Larvae based on Brain* (Cooperation with University Leipzig, UCLA, HHMI, RWTH Aachen).

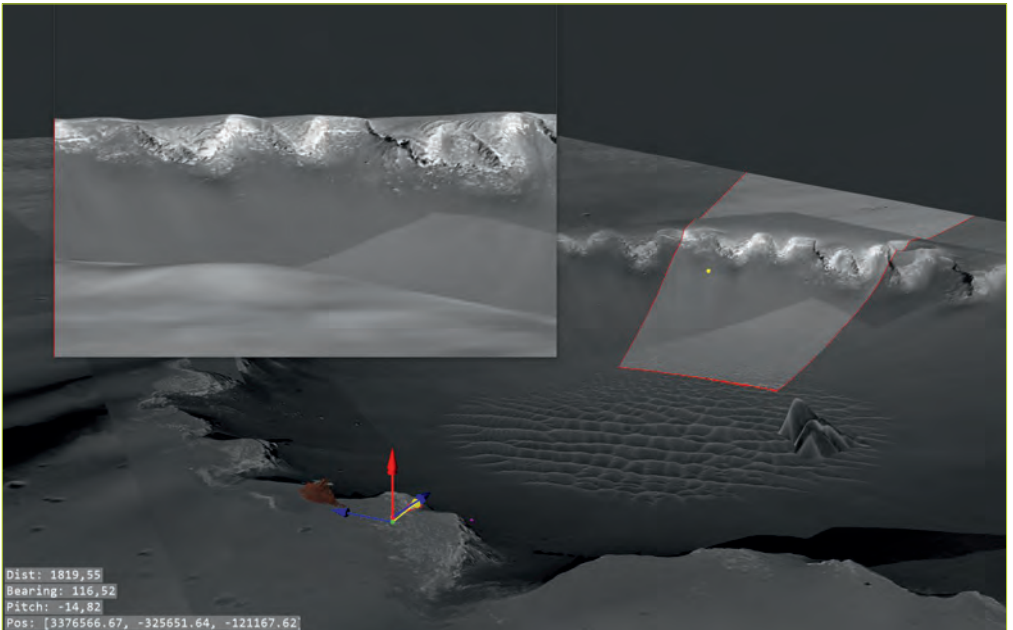


Visualisation of a traffic solution in urban space.

We offer expertise and innovation

VRVis was founded in 2000 out of the desire to become an Austrian leader of innovation in visual computing. Our 70 staff members develop and optimise technologies, processes and solutions through to manufacturing prototypes. They are familiar with the language, the market and the needs of each business partner and can therefore act as translators between research and industry. Our guiding principles of diversity and innovation do not simply advance the state of technology, they are also at the core of our company culture.

We cooperate closely with Technical Universities in Vienna and Graz, the University of Vienna and a number of international research institutes, such as ETH Zurich, Virginia Tech and the University of Magdeburg. In this way, we can implement results from basic research in subsequent custom solutions or ready-to-use prototypes.



Detailed reconstruction of the Victoria crater on Mars.

We offer

- Consulting
- Custom solutions
- Application-driven research and development
- Research and feasibility studies
- Selection of the right funding scheme
- Help with writing proposals
- Project management
- Reporting to the funding agency
- Targeted communication and PR

A selection of our references



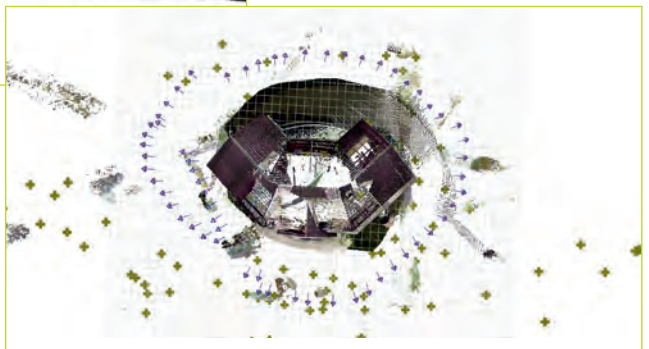
Fusion of 3D data

The availability of new technology for the three-dimensional depiction of buildings and landscapes presents the surveying sector with completely new challenges. On the one hand, inexpensive laser scanners, drones and photogrammetric methods offer enormous data volumes and therefore potentially a high number of details for digitalisation. On the other hand, both the processing and the correct registration and verification of that information requires completely new approaches.

The company rmDATA confronted this challenge in our shared VGM (Virtual Geodetic Mapper) project. By developing highly efficient dynamic data structures, interactive workflows and real-time visualisations, it was possible to manage the multimodal variety of data and take important steps towards accurate 3D digitalisation. For example, for the first time, the interactive visualisation and real-time editing of point cloud data consisting of several hundred million points is no longer a problem. This in turn provides the basis for the development of new smart modelling methods, in which extracted semantic and geometric information will be used to significantly shorten the workflow of surveyors through suggestion-based modelling techniques.



Interactive editing and cleaning poses no problem anymore – even in data sets with up to several hundred million points.

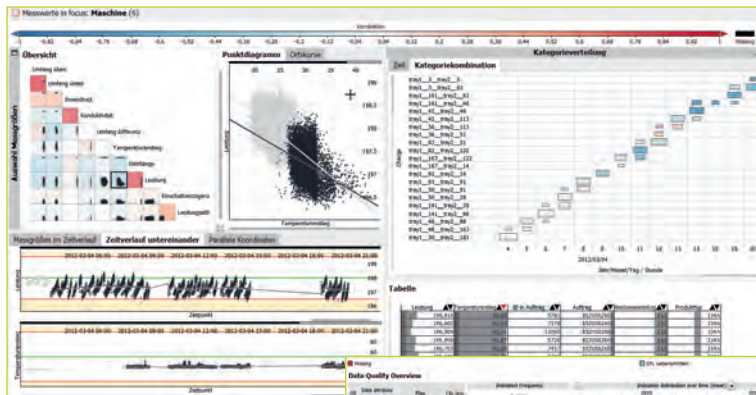


Laser Scan, photogrammetric data (blue) and tachymetric measurement points (green) are registered and visualized in a common coordinate system.

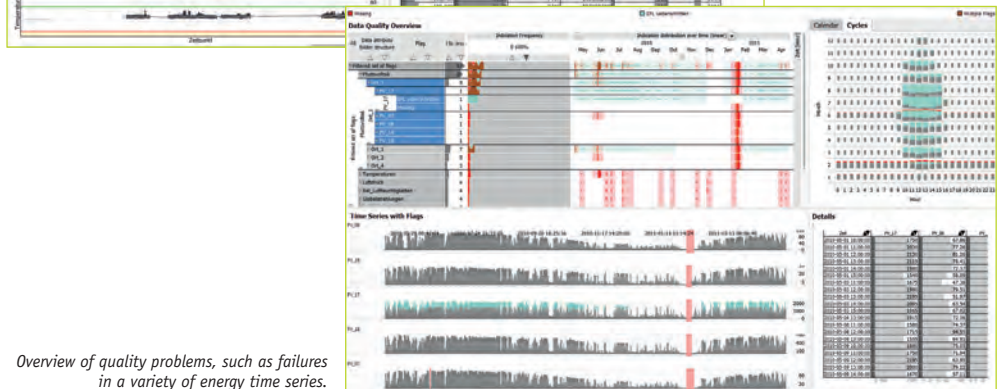
Visual analytics – data is the new capital

The era of gold and oil is over; the currency of our time is data. Company and industry data contains an enormous amount of potential information and solutions. Visual analytics brings structure into all that data, finds the needle in the haystack and visualises it in such a way that it is beneficial for companies.

The TOHIVA (Task-Oriented Visual Analysis of High-Dimensional Data) project was dedicated to the research of new technologies for the visual analysis of large amounts of high-dimensional data. Based on Visplore, VRVis' own software platform, interactive dashboards were created, which make it possible, for example, to quickly identify the causes of quality defects in industrial production. This enabled our project partner RHI to significantly shorten analysis processes and analyse a number of new hypotheses in a short time. Dashboards also help to validate simulation data in engine development and to quickly identify essential influences on engine characteristics.



Dashboard, which was developed together with RHI and is also used there. The goal of the dashboard is to find connections between measured variables and also production parameters.



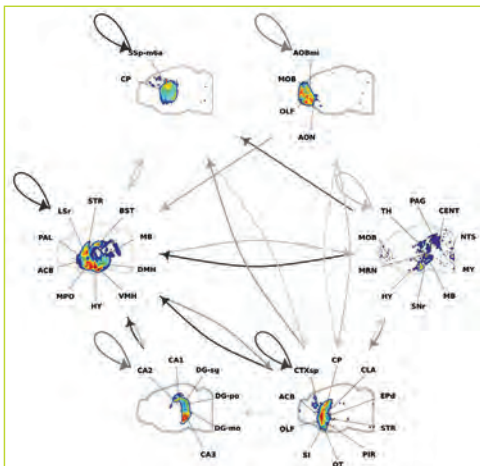
Overview of quality problems, such as failures in a variety of energy time series.

Big Data in Medicine and Life Sciences

Pictures are Big Data: In particular, three-dimensional, multi-channel and time-dependent image data, as well as entire image data collections, can become extremely large and contain a great deal of information. This information is often not directly quantifiable or detectable and can only be used with great effort. The extraction and provision of this information and its combination with other experimental, genetic and / or demographic data is one of the major challenges addressed by our research group Biomedical Image Informatics. The expert group covers the complete analytical workflow of Machine Learning for fully automatic image segmentation and annotation, data fusion, analysis and visualisation, as well as image database development and data mining.

Together with the company AGFA Healthcare, for example, deep learning methods are being developed to accelerate radiological workflows and diagnoses. In the context of the EU SUMMER project, Visual Computing solutions for radiotherapy have been developed. In various projects we developed platforms and tools for image and big data-based brain research on fruit flies, zebrafish, mice and humans for and with partners in Austria (IMP Vienna, Meduni Wien), Germany (University of Leipzig, Uni Konstanz, RWTH Aachen), France (CNRS, Tefor) and USA. (See also Braingazer.org)

The quality of our work is reflected in long-standing co-operations, several patents and a large number of publications in renowned science journals and conferences.



Prediction of functional neuroanatomic maps in silico.



A fully automatic algorithm for the extraction of blood vessels from CT data (data provided by AGFA).

Virtual fire extinguishers

Fire safety training for non-professionals is expensive, complicated and dangerous. Simulations in virtual environments offer a solution to this problem. In this virtual reality application, training can be provided regarding the use of fire extinguishers and the correct behaviour in the event of a fire. Virtual fire safety training is significantly superior to training in real conditions in terms of safety, feasibility and choice of training scenarios. It is an inexpensive alternative, but still offers an appealing and interactive training experience.

The HTC Vive virtual reality device, combined with the Unity high-level game development framework, was used to create a 360° fire simulation. Among other uses, this enables trainees to interact with fire in a safe environment. An external supervisor can control the scenario for professional formative feedback. Visual effects, realistic lighting, appropriate shading techniques and a physical approximation of fire growth make the learning environment realistic and immersive.



The Virtual Reality application is a safe and cost-effective alternative.



Various fire protection drills can be carried out in different scenarios.

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VRVis Zentrum für Virtual Reality und Visualisierung
Forschungs-GmbH
Donau-City-Straße 11, 1220 Wien
office@vrvis.at, www.vrvis.at
+43 1 908 98 92

The VRVis Forschungs-GmbH is funded by COMET – Competence Centers for Excellent Technologies (854174) by BMVIT, BMWFW, Styria, Styrian Business Promotion Agency – SFG and Vienna Business Agency – A Service offered by the City of Vienna. The COMET programme is managed by FFG.



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